

Customer No. 26629
Confirmation No. 1592

Patent
Attorney Docket No. WWCI0015.001

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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In re Application of : Kolb et al.
Serial No. : 10/604,593
Filed : August 1, 2003
For : SINGLE COIL SOLENOID HAVING A PERMANENT MAGNET WITH BI-DIRECTIONAL ASSIST
Group Art No. : 2832
Examiner : Bernard Rojas

CERTIFICATION UNDER 37 CFR 1.8(a) and 1.10

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37 CFR 1.8(a)

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Date: May 15, 2006

Jessica A. Calaway
Signature

Commissioner for Patents
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REQUEST FOR PRE-APPEAL BRIEF CONFERENCE

Dear Sir:

A Notice of Appeal is filed concurrently herewith. Applicant hereby requests pre-appeal review of the final rejection in the above-identified application. No amendments are being filed with this request. The review is requested for the reasons set forth below.

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REMARKS

Claims 1, 2, 5-17, and 22-29 are pending. Claims 18-21 have been withdrawn by the Examiner, although a Petition for Supervisory Review is pending to rejoin all claims. Claims 28-29 are allowed and claims 9-10 were indicated as containing allowable subject matter. Claims 1, 2, 5-8, 11-17, 22, & 25-27 were rejected under 35 U.S.C. §102(b) as being anticipated by Shlomi et al. (USP 6,199,587; "Shlomi"). Claims 23-27 were also alleged to be "obvious" (Office Action, page 5) even though the only rejection set forth is a §102(b) rejection.

Jurisdiction: The Office Action of March 15, 2006 was made final. It is believed that the Panel has jurisdiction to decide this matter because the Examiner has disregarded specific claim limitations, and therefore, a decision is not based on interpretation of the reference.

Drawing Objection: The drawings were objected to because the Examiner asserted that the drawings did not show a "solenoid housing." Applicant notes the description of the "solenoid housing" 50 in ¶¶24, 25 & 28 of the Specification as shown in FIGS. 2-3. Withdrawal of the objection to the drawings is respectfully requested.

Claim Rejections - 35 U.S.C. § 102 / Obviousness: In Applicant's October 31, 2005 Response, Applicant amended independent claims 1, 11, 22, and 23. The Examiner did not formulate any rejection of the claims having these amendments. A comparison of the 3/15/06 Final Office Action and the 10/18/2005 Office Action clearly indicates the Examiner simply cut and pasted the 10/18/2005 arguments into the 3/15/06 Final Office Action without any addition analysis. Applicant also provided a detailed explanation of Shlomi in the 10/31/2005 Response which was not responded to, nor apparently considered.

Since the Examiner's citations to the applied reference is missing at least one element of each of Applicant's independent claims, Applicant respectfully submits that the claimed invention is not anticipated as set forth by the Examiner's citations to the applied reference.

INDEPENDENT CLAIM 1 AND CORRESPONDING DEPENDENT CLAIMS 2 and 5-8

The applied reference does not teach or suggest the claimed invention. The reference fails to teach or suggest, for example, the return spring operationally connected to bias the movable magnetic object in the return position against the spacer when no current is induced in the single coil and the return spring at least partially disposed outside the solenoid housing, together with the other elements as recited in independent claim 1.

Shlomi discloses (column 6, lines 44-58; FIGS. 1-2, 6A-6C, 9-10, and 19):

A helical spring 62 is then inserted into the iron core 58 and fitted in place by the insertion of a snapping 66 into the groove 48 in plunger 42, thereby forming the plunger sub-assembly 40. The spring 62 has the effect of generating an internal bias with the plunger that prevents the formation of airgaps between the different magnetic components, 54, 56 & 58 so that in practice they form a single magnetic unit.

Plunger sub-assembly 40 is inserted into assembly lower housing within the hollow cylindrical center of the coil 35, such that the sealing dome 50 faces port 12 and is able to contact seat 38.

An upper housing 70 is inserted into the lower housing 30, to fit snugly within the upper rim 82 of the lower housing. The upper rim 82 is then folded over shoulder 84 of the

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upper housing to form a single unit. A permanent magnet 72, which is in ring form, is fixed over the neck 73 of the upper housing 70, and a plastic protective cover 74 is placed over the magnet 72.

First, in Shlomi, the helical spring 62 is entirely disposed within the lower housing 30 and the upper housing 70. Applicant's claimed return spring comprises the return spring 46 and a solenoid housing. As illustrated in Applicant's FIG. 2, the return spring 46 is at least partially disposed outside of the solenoid housing 50. Shlomi fails to disclose, *inter alia*, the helical spring 62 at least partially disposed outside the lower housing 30 and the upper housing 70. Further, simply missing from the Examiner's citation to Shlomi is any mention of the return spring operationally connected to bias the movable magnetic object in the return position against the spacer when no current is induced in the single coil and that the return spring is at least partially disposed outside the solenoid housing, as clearly recited in Applicant's independent claim 1.

Accordingly, the rejection is not sustainable as Shlomi fails to satisfy all the limitations recited in claim 1. Furthermore, the Office Action does not allege that the art of record provides any teaching, suggestion, or incentive to modify Shlomi to provide the claimed configuration.

For at least the reasons presented above, claim 1 is believed neither anticipated nor rendered obvious over the cited art of record. The corresponding dependent claims 2 and 5-8 are believed allowable for at least the same reasons as independent claim 1, as well as for their own additional characterizations.

INDEPENDENT CLAIM 11 AND CORRESPONDING DEPENDENT CLAIMS 12-17

The applied reference does not teach or suggest the claimed invention. The reference fails to teach or suggest, for example, the permanent magnetic separated from the armature by the non-magnetic spacer wherein the permanent magnet magnetically attracts the armature when the single coil is de-energized and magnetically repels the armature when the single coil is energized, and wherein the non-magnetic spacer remains in the fixed position during movement of the movable armature, all as clearly set forth in claim 11.

Shlomi discloses (col 6, lns 29-35, col 7, lns 34-50, col 11, lns 10-20; FIGS. 1 and 6A-6C):

The plunger sub-assembly 40 preferably comprises a plunger 42, preferably of plastic or any other non-ferrous material, a first sealing dome 44 for sealing port 16, a shoulder 45, a second sealing dome 50 for sealing port 12, and a snap ring groove 48. The sealing domes 44 and 50 may be made as an integral part of the plunger or they may be separate integers, for example of rubber.

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Referring now to the embodiment shown in FIG. 1, the valve has two states, powered and unpowered. FIG. 1 shows the valve in the unpowered state, in which no voltage is provided across the connection 36 to the coil. This state is one of the two stable states of the valve. The same position is also achieved during the transient state that exists when the coil 35, is initially powered up prior to moving, as will be described below. In the unpowered state the plunger 42 is generally attracted by its ferrous ring 54, to permanent magnet 72. The plunger 43 is thus distanced from the seat 38 of port 12 so as to provide a path for fluid flow from port 14 through conduits 60 in the iron core 58 to port 12. Ports 12 and 14 are thus open,

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forming a fluid passage therebetween. The force of the magnet is sufficient to ensure that a watertight seal is formed between seat 46 and dome 44, despite the pull of spring 62.

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because the force of spring 62 aids the seal, and in this position the force of magnet 72 on the plunger is quite weak, (the force of magnet falls in proportion to the cube of the distance) the coil 35 does not have to produce a strong force to keep the plunger 42 against the lower seat 38. Strong force is required only to pull the plunger 42 away from the magnet 72. Further, in order to reduce the force required to part the plunger 42 from the magnet 62 the shoulder ring 46, which, it will be recalled, sits between dome 44 and ferrous ring 54, serves to prevent the ferrous ring from actually touching the magnet 72.

In Shlomi, the dome 44 is fixed to the plunger 42. When the plunger 42 moves distally from the port 16, the dome 44 moves with the plunger 42 and opens the sealing port 16. When the plunger moves proximally to the port 16, the dome 44 moves with the plunger 42 and closes the port 16. In an exemplary implementation, Applicant's claimed non-magnetic spacer comprises the non-magnetic spacer 42 positioned adjacent to the permanent magnet 38. Shlomi fails to disclose, *inter alia*, the dome 44 in a fixed position that witnesses relative movement of the plunger 42. Simply missing from the Examiner's citation to Shlomi is any mention of the permanent magnetic separated from the armature by the non-magnetic spacer wherein the permanent magnet magnetically attracts the armature when the single coil is de-energized and magnetically repels the armature when the single coil is energized, and wherein the non-magnetic spacer remains in the fixed position during movement of the movable armature, as recited in claim 11.

Accordingly, the rejection is not sustainable as Shlomi fails to satisfy all the limitations recited in claim 11. Furthermore, the Office Action does not allege that the art of record provides any teaching, suggestion, or incentive to modify Shlomi to provide the claimed configuration.

For at least the reasons presented above, claim 11 is neither anticipated nor obvious over the art of record. The corresponding dependent claims 12-17 are believed allowable for at least the same reasons as independent claim 11, as well as for their own additional characterizations.

INDEPENDENT CLAIM 22

Shlomi does not teach or suggest the claimed invention. The reference fails to teach or suggest, for example, the second magnetic circuit between the plunger and the stationary attracting member at the second electromagnetic condition created when the single coil of wire is energized, and wherein the plunger is linearly spaced from the stationary attracting member by the first magnetic circuit and driven linearly towards the attracting member by the second magnetic circuit, as clearly recited in claim 22.

Shlomi discloses (column 6, lines 36-52; FIGS. 1 and 6A-6C):

Iron ring 54 is added to the plunger 42 and drawn up until it rests against shoulder 45. Iron ring 54 comprises conduits for conducting fluid flow therethrough. Hollow cylindrical member 56 which is of ferrous material, is then drawn up behind the iron ring 54 until it rests snugly thereagainst. Behind this an iron core 58 is then drawn along the plunger in like manner

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until it reaches the hollow cylindrical member 56. Iron core 58 has a number of axial conduits 60, preferably four, for carrying fluid across the plunger. A helical spring 62 is then inserted into the iron core 58 and fitted in place by the insertion of a snapping 66 into the groove 48 in plunger 42, thereby forming the plunger sub-assembly 40. The spring 62 has the effect of generating an internal bias with the plunger that prevents the formation of airgaps between the different magnetic components, 54, 56 & 58 so that in practice they form a single magnetic unit.

Plunger sub-assembly 40 is inserted into assembly lower housing within the hollow cylindrical center of the coil 35, such that the sealing dome 50 faces port 12 and is able to contact seat 38.

In Shlomi, the iron core 58 and the plunger 42 are part of the plunger sub-assembly 40. When the plunger sub-assembly 40 moves, the iron core 58 and the plunger 42 move together. Applicant's claimed first magnetic circuit is between the movable plunger 44 and the permanent magnet 38 that is spaced from the movable plunger 44 by the non-magnetic spacer 42 at the first electromagnetic condition created when the single coil of wire 36 is not energized, and second magnetic circuit is between the plunger 44 and the stationary attracting member 56 at the second electromagnetic condition created when the single coil of wire 36 is energized, wherein the plunger 44 is linearly spaced from the stationary attracting member 56 by the first magnetic circuit and driven linearly towards the attracting member 56 by the second magnetic circuit. Shlomi fails to disclose, *inter alia*, the plunger 42 linearly spaced from the iron core 58 by the first magnetic circuit and driven linearly towards the iron core 58 by the second magnetic circuit. Simply missing from the Examiner's citation to Shlomi is any mention of the second magnetic circuit between the plunger and the stationary attracting member at the second electromagnetic condition created when the single coil of wire is energized, wherein the plunger is linearly spaced from the stationary attracting member by the first magnetic circuit and driven linearly towards the attracting member by the second magnetic circuit, as recited in claim 22.

Accordingly, the rejection is not sustainable as Shlomi fails to satisfy all the limitations recited in claim 22. Furthermore, the Office Action does not allege that the art of record provides any teaching, suggestion, or incentive to modify Shlomi to provide the claimed configuration.

For at least these reasons, claim 22 is believed neither anticipated nor obvious over the art of record.

INDEPENDENT CLAIM 23

Shlomi does not teach or suggest the claimed invention. The reference fails to teach or suggest, for example, the armature configured to move linearly through the bore of the single coil bobbin between the permanent magnet and the attracting stud, as recited in claim 23.

Referring to col 6, lns 6-8 and 28-63, col 7, ln 35, to col 8, ln 23, col 10, lns 25-30; FIGS. 1 and 6A-6C, Shlomi discloses a lower housing 30 of ferrous material that forms the base of the valve and provides part of a magnetic circuit that operates the valve. The cited sections describe in detail the construction of Shlomi, as argued previously. In Shlomi, the iron core 58 and the plunger 42 are part of the plunger sub-assembly 40.

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Shlomi fails to disclose, *inter alia*, the plunger 42 having linearly movement between the permanent magnet 72 and the iron core 58. Applicant's claimed armature 44 is configured to move linearly through the bore of the single coil bobbin 34 between the permanent magnet 38 and the attracting stud 56. Simply missing from the Examiner's citation to Shlomi is any mention of the armature configured to move linearly through the bore of the single coil bobbin between the permanent magnet and the attracting stud, as recited in claim 23.

Accordingly, the rejection is not sustainable as Shlomi fails to satisfy all the limitations recited in claim 23. Furthermore, the Examiner does not allege that the art of record provides any teaching, suggestion, or incentive to modify Shlomi to provide the claimed configuration.

For at least the reasons presented above, claim 23 is believed neither anticipated nor obvious over the applied art of record. The corresponding dependent claims 24-27 are believed allowable for at least the same reasons as independent claim 23, as well as for their own additional characterizations.

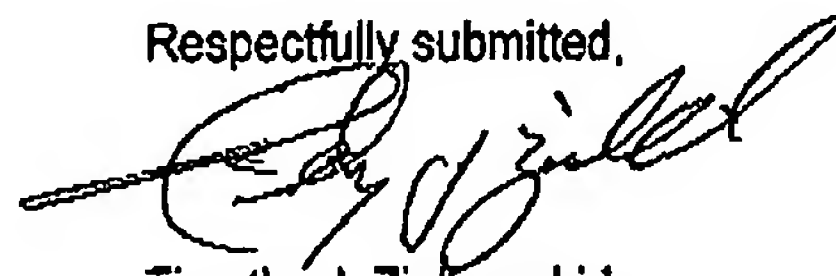
Withdrawal of the § 102 and alleged obviousness rejections is therefore respectfully requested. Therefore, in light of at least the foregoing, Applicant respectfully believes that the present application is in condition for allowance. Additionally, Applicant awaits a response to its Petition filed August 17, 2004 seeking Supervisory Review of the Restriction Requirement made final on June 30, 2004.

Applicant appreciates the Panel's consideration of this Request and respectfully requests timely issuance of a Notice of Allowance.

Dated: May 15, 2006
Attorney Docket No.: WWCI0015.001

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¹ The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 50-2623. Should no proper payment be enclosed herewith, as by credit card authorization being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 50-2623. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicant hereby petitions for such extensions under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 50-2623. Please consider this a general authorization to charge any fee that is due in this case, if not otherwise timely paid, to Deposit Account No. 50-2623.